GE Healthcare

ÄKTAexplorer

Installation Guide

ÄKTA™

Important user information

All users must read this entire manual to fully understand the safe use of ÄKTAexplorer.

WARNING!

The WARNING! sign highlights instructions that must be followed to avoid personal injury. It is important not to proceed until all stated conditions are met and clearly understood.

CAUTION!

The Caution! sign highlights instructions that must be followed to avoid damage to the product or other equipment. It is important not to proceed until all stated conditions are met and clearly understood.

Note

The Note sign is used to indicate information important for trouble-free and optimal use of the product.

CE Certifying

This product meets the requirements of applicable CE-directives. A copy of the corresponding Declaration of Conformity is available on request.

The **CE** symbol and corresponding declaration of conformity, is valid for the instrument when it is:

– used as a stand-alone unit, or

– connected to other CE-marked GE Healthcare instruments, or

– connected to other products recommended or described in this manual, and

– used in the same state as it was delivered from GE Healthcare except for alterations described in this manual.

Recycling

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

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1 About this installation guide

ÄKTAexplorer™ is assembled and fully tested before shipping.

For safe transportation, however, some components have been detached and thus need to be remounted.

Cables, capillaries, accessories, column holder, etc. are enclosed in paper boxes or in Box-900 located at the top of the instrument pile.

This guide describes how to install ÄKTAexplorer. The guide is divided into two parts; one describing the installation and one describing how to run the installation test. After the installation procedure has been performed, your ÄKTAexplorer is ready for purification work.

For full details of specifications, methods, maintenance, etc., refer to the respective User Manuals and Instructions.

2 Safety

- The system is designed for indoor use only.
- Do not use in a dusty atmosphere or close to spraying water.

Refer to Technical Specifications in the System Manual for detailed environmental pre-requisites.

WARNING! The individual instruments must not be opened by the user. They contain high voltage circuits that can give a lethal electric shock.

WARNING! Monitor UV-900 uses high intensity ultra-violet light. Do not disconnect the optical unit while the lamp is ON.

WARNING! ÄKTAexplorer must be connected to a grounded mains socket.

WARNING! There must always be a sample loop or Superloop™ connected to ports 2 and 6 of the injection valve. This prevents liquid spraying out of the ports when switching the valve, which is especially dangerous if hazardous chemicals are being used.

WARNING! Two people are required to lift the system.

WARNING! Never block the ports on the outlet valve with stop plugs, since this will create over-pressure and might result in injury.

WARNING! Only spare parts approved or supplied by GE Healthcare may be used for maintaining and servicing the system.

WARNING! If the system is turned around or the fraction collector removed, the external capillaries and other tubings may become entangled in nearby objects and be pulled from their connections causing leakage.

WARNING! Never place waste containers on the top of the system. If they become full and overflow, liquid may penetrate the system causing a short-circuit.

WARNING! If heavier instrument components such as the pump are removed from the rack and the door is then opened fully, the shift in the centre of gravity of the system may cause it to tip over.

WARNING! Never place buffer containers on the top of the valve door.If this is done, the containers may fall down when the valve door is opened. Place the buffer containers on the buffer tray above Box-900.

WARNING! If the door is quickly pulled open to its full extent, the internal capillary tubings may be pulled from their connections causing leakage.

3 Pre-requisites

WARNING! ÄKTAexplorer must be connected to a grounded mains socket.

- Two people are required to lift ÄKTAexplorer onto the working bench.
- To install ÄKTAexplorer, a working area of about 200 x 80 cm is required.
- ÄKTAexplorer requires 100–120/220–240 V~, 50/60 Hz electrical supply with safety grounding.
- Cutting-pliers are recommended for cutting plastic straps.
- A waste flask is needed.
- The installation test requires the following solutions:
  - 1000 ml of distilled water for priming and purging the pump.
  - 500 ml of 0.4% acetone in distilled water.
  - 100 ml of 20% ethanol in distilled water.

4 Installation overview

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- Complete the registration form 31
- Complete the final section of the installation record 30
- Store photocopies of all records and forms in the System Logbook.
- Store the Installation Guide in the User Manual box.

5 Installation of ÄKTAexplorer

Begin by creating a clean and dry working area of 200 x 80 cm that allows easy access. Then follow the step-by-step instructions below and fill in the installation record as you go along, see page 30.

Note: *Some components are packed in Box-900, located at the top of the system.*

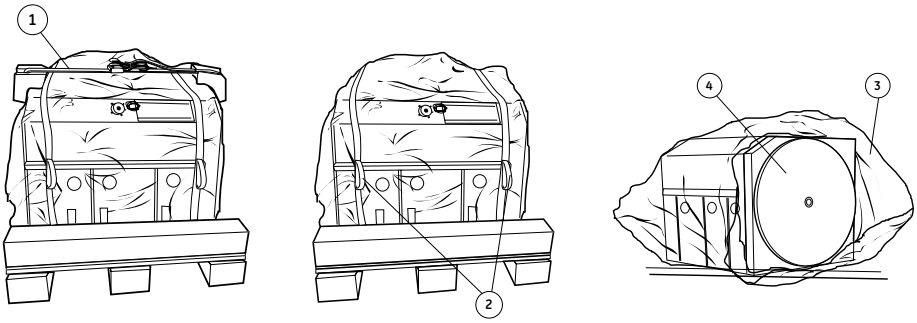
Note: *Some packing lists are included in the paper boxes.*

5.1 Unpacking

1 After having removed the cardboard hood, check the contents against the attached packing list. Check also all included boxes. Store all the enclosed paper boxes andplastic bags in a convenient nearby place.

2 Release and remove the red strap (1) holding the system to the pallet.

3 Lift ÄKTAexplorer onto the work area using the four strap handles (2). Two people are required to lift the system. Do not raise to upright position yet. Lay the system on the same side as on the pallet.



4 Release the two red straps with the strap handles. Allow the straps to remain taped to the plastic cover.

5 Pull back the plastic cover (3) to uncover the swivel platform (4) and raise the system to an upright position.

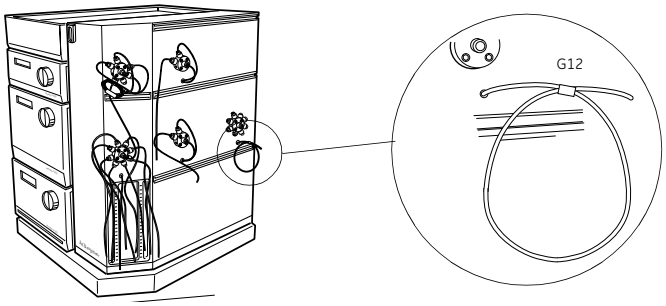
6 Remove the plastic cover with the red straps from the system.

7 Save all the original packing material. If, for any reason, the equipment has to be repacked, for transportation or otherwise, it is important that the system can be safely packed using the original packing material.

5.2 Installing the pH flow cell

1 Install the pH flow cell holder (packed in Box-900) in the groove directly below the outlet valve (V4) on the outside of the valve door.

2 Push the slide clamp upwards to secure the pH flow cell holder.



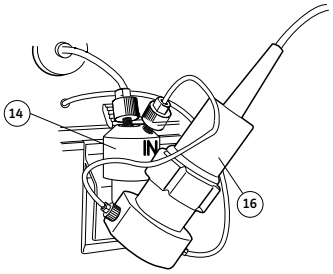
3 Connect capillary G12 to the inlet of the pH flow cell.

4 Connect the outlet of the pH flow cell to the FR-904 flow restrictor (marked IN) using the G13 capillary.

5 Connect the outlet of the FR-904 flow restrictor to the centre port of the V4 outlet valve using the G14 capillary.

6 Place the FR-904 flow restrictor (14) in the hole in the pH flow cell holder.

7 Mount the pH electrode (16), according to the figure, for experiments where pH is to be measured. Otherwise, mount the pH electrode dummy in the hole in the pH flow cell holder.

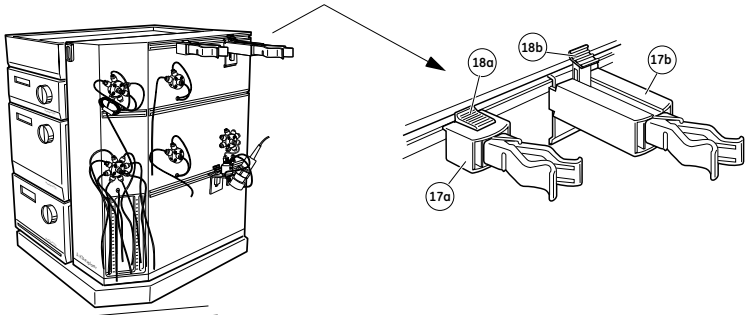


Note: *Do not install the pH electrode until the installation test has been performed.*

Note: *When using the pH electrode, the flow restrictor FR-904 must be replaced with the supplied flow restrictor FR-902. Otherwise, the long term stability and lifetime of the pH electrode will deteriorate.*

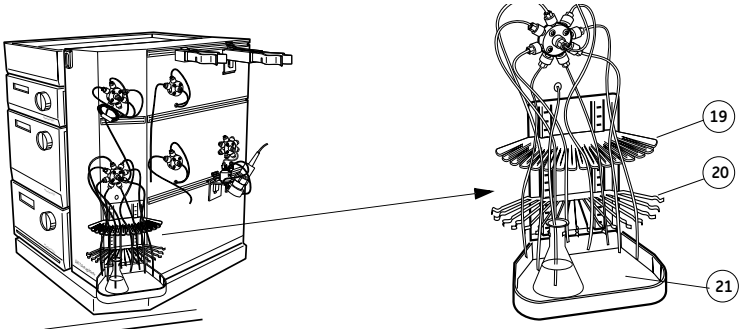
Note: *For calibration of the pH electrode, refer to the UNICORN™ User Manual.*

5.3 Installing column holders and tubing holders

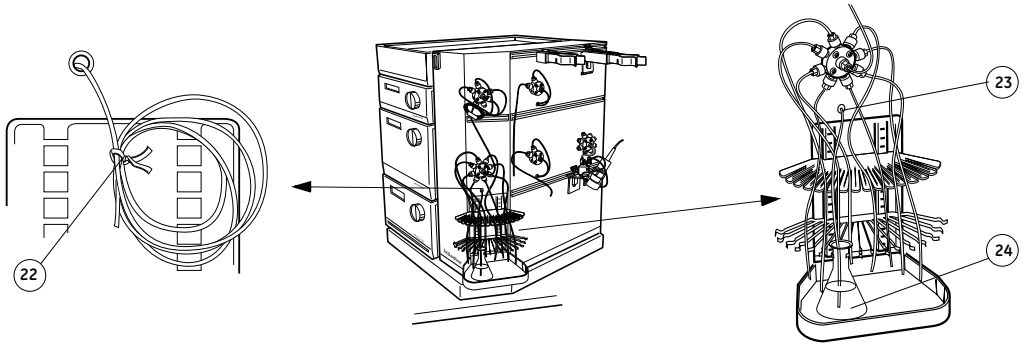


1 Install the column holders (17a, 17b packed in Box-900) onto the valve door. They should be placed close to the column selection valves (V2 and V3).

Note: *To release the column holders, press the slide clamp (18a, 18b) downward.*



2 Install the tubing holder (19), the tube holders (20) and the sample tray (21) by pushing them into the slits below the sample valve (V5).

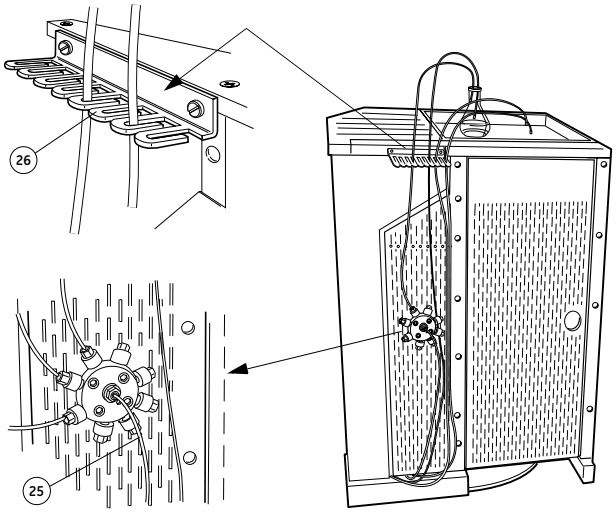


3 Locate the sample pump waste tubing (23) penetrating the valve door. Remove the wire clips (22) from the tubing and place the outlet in an E-flask (24) placed on the sample tray.

Note: *For calibration of the sample pump, refer to the Pump P-960 User Manual.*

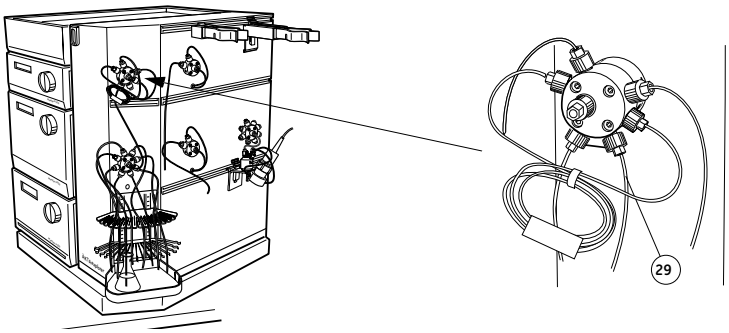
5.4 Connecting tubings

1 Turn ÄKTAexplorer on its swivel platform to access the rear and remove the plastic bag from the inlet tubings marked A11, A2, B1 and B2.



2 Locate the buffer valve (V6) and connect the tubing marked A1 (25) to the central port of the buffer valve.

3 Snap the inlet tubings A11, A2, B1 and B2 into the tubing holder (26) located at the upper left.



4 Turn ÄKTAexplorer on its swivel platform to access the valve door.

5 Remove the wire clips from the waste tubing connected to port 5 (29) on the injection valve (V1).

6 Place the waste tubing in a waste bottle and place the bottle in front of ÄKTAexplorer or where convenient.

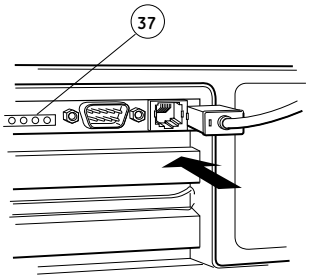
Note: *The installation of a fraction collector (optional) is described in detail in the ÄKTAexplorer Optional Configurations User Manual. Refer to the section that describes your fraction collector.*

5.5 Installing the computer and the mains cable

Unpack and install the computer and printer according to the manufacturer's instructions. Place them to the left of the system. Do not switch them on!

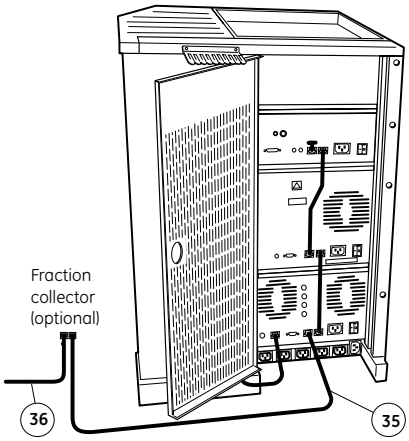
CAUTION! The mains power to ÄKTAexplorer must be switched OFF before the UniNet-1 cabling is installed.

1 Complete the UniNet-1 data communication chain by connecting a UniNet-1 cable between the computer and Pump P-900.



CAUTION! The UniNet connection to the computer MUST be made to the board with four LEDs (37).

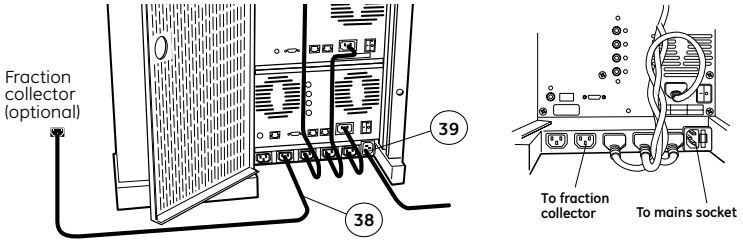
2 If using a fraction collector, connect UniNet 1 cable (35) between Pump P-900 and the fraction collector, and UniNet 1 cable (36) between the fraction collector and the computer.



3 All other UniNet-1 cables are connected at delivery.

WARNING! ÄKTAexplorer must be connected to a grounded mains socket.

4 Connect a mains cable (39) supplied between ÄKTAexplorer and a properly grounded mains socket according to the circled figure. Do not switch on.



5 If using a fraction collector, connect a mains cable supplied (38) between the fraction collector and a mains socket at the rear of ÄKTAexplorer.

6 Complete the two first sections of the Installation record on page 30.

7 The installation phase of ÄKTAexplorer is now completed.

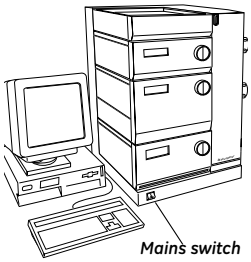
6 Installation test

The installation test is designed to check the function of the liquid delivery and the UV monitoring system of ÄKTAexplorer. The installation test can also be used at any time to check the condition of the system, e.g. after a prolonged stop.

Correct gradient formation is tested by producing a linear gradient and a series of concentration steps of acetone.

Correct UV monitoring is tested by monitoring the acetone concentration at 265, 254 and 280 nm and calculating the absorbance ratios 265 nm/254 nm and 265 nm/280 nm.

6.1 Preparation of ÄKTAexplorer



6.1.1 Startup of the ÄKTAexplorer separation unit

1 Switch on the separation unit using the mains switch located to the left on the base platform.

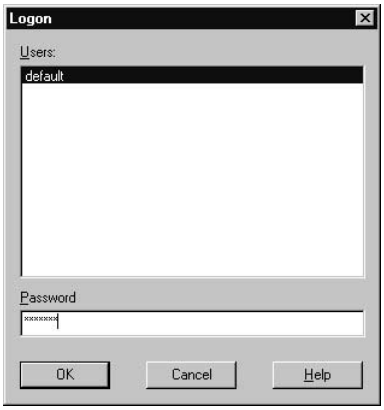
6.1.2 Startup of the computer and UNICORN software

1 Switch on the computer, the display and the printer according to the instructions in the manufacturer manuals.

2 Log into Windows® by first pressing **Ctrl-Alt-Del**, and then clicking **OK**.

3 When the Windows desktop appears, start UNICORN by doubleclicking on the UNICORN icon.

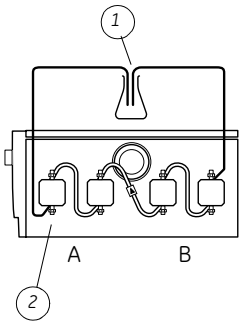
4 Select user **default** and enter **default** as password. Click **OK**.



5 Click the **System Control** button in the taskbar.

6.2 Priming and purging Pump P-900

Prime the piston seal rinsing system of pump P-900 as follows:



1 Immerse the rinsing tubing in a flask (1) containing 20% ethanol in distilled water.

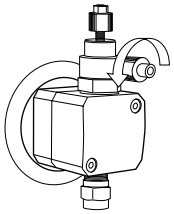
2 Connect a syringe to the rinsing tubing that is connected underneath (2) the left pump head on pump A. Slowly draw rinsing solution to the syringe. When rinsing solution starts to enter thesyringe, continue to draw a few millilitres.

3 Loosen the syringe and put the tubing in the rinsing solution (1).

Purge the pump P-900 as follows:

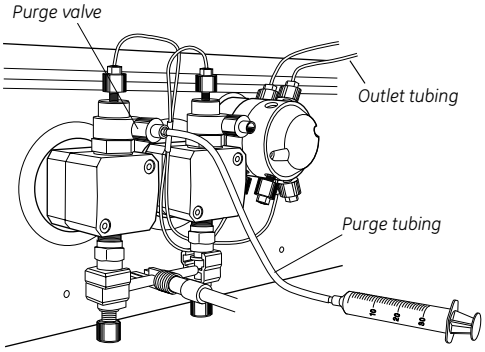
1 Immerse the filters of inlet tubing A11 and B1 in the distilled water.

Note: *Never place the reservoir flask below the level of the pump inlet*.



2 Connect a male Luer syringe of about 30 ml to the open end of the purge tubing.

3 Connect the male Luer connector at the other end of the purge tubing to the left purge valve at pump module A.



4 Turn the purge valve counter clockwise half a turn to open it and slowly draw eluent into the syringe.

5 When fluid starts to enter the syringe continue to draw a few millilitres before closing the purge valve. Check that there is novisible air left in the inlet tubing.

6 Repeat steps 3 to 5 for all pump heads.

6.2.1 Testing pressure stability

Perform a pressure test to establish that all air has disappeared from the pump heads. Perform as follows:

1 Connect a column bypass capillary between the injection valve, port 1, and the top of the UV optical unit.

2 ***ÄKTAexplorer 10 (to check pump module A):***
Run 0.2 ml/min at 0%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.02 MPa).

ÄKTAexplorer 100 (to check pump module A):
Run 10 ml/min at 0%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.2 MPa).

3 ***ÄKTAexplorer 10 (to check pump module B):***
Run 0.2 ml/min at 100%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.02 MPa).

ÄKTAexplorer 100 (to check pump module B):
Run 10 ml/min at 100%B (distilled water). Check on the pump display that the pressure reading is stable (variation < ±0.2 MPa).

4 Proceed to step 5 if the pressure is stable. If not, consult the Pump P-900 User Manual for troubleshooting instructions.

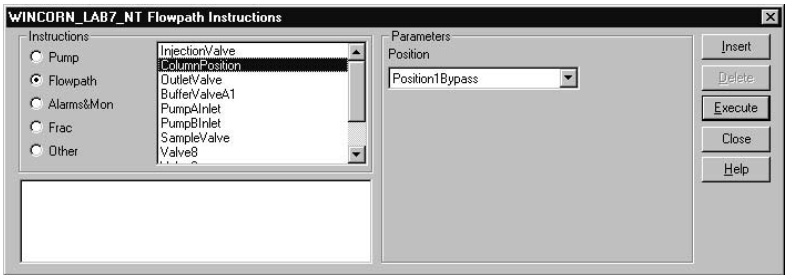
5 Click **END.**

6.3 Preparing the installation test

1 Move inlet tubing B1 to a flask containing 500 ml of 0.4% acetone in distilled water.

2 Make sure that a bypass capillary is installed between port 1 of the V2 and V3 column selection valves.

3 In the **System Control** module, select menu **Manual:Flowpath.** Then select **ColumnPosition/Position1Bypass.**



4 Check that the correct mixer chamber is installed in the mixer:

– 0.6 ml in ÄKTAexplorer 10

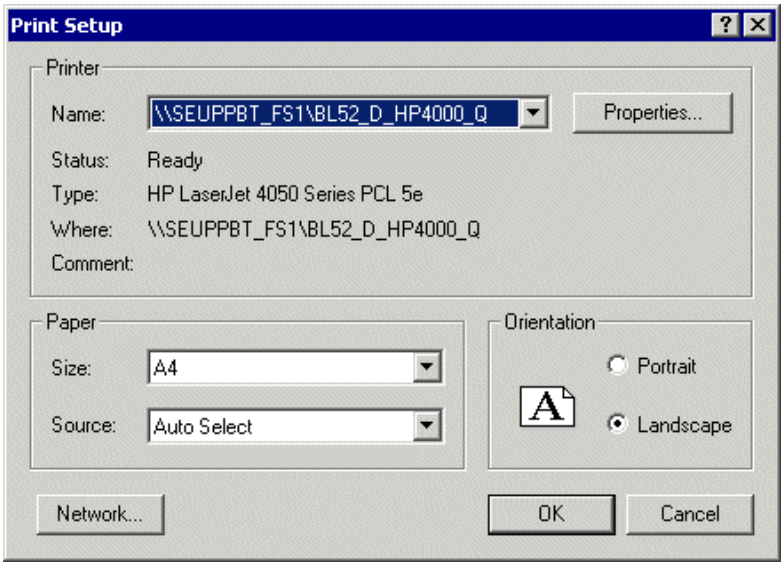
– 2.0 ml in ÄKTAexplorer 100

Installation Test Method Guide

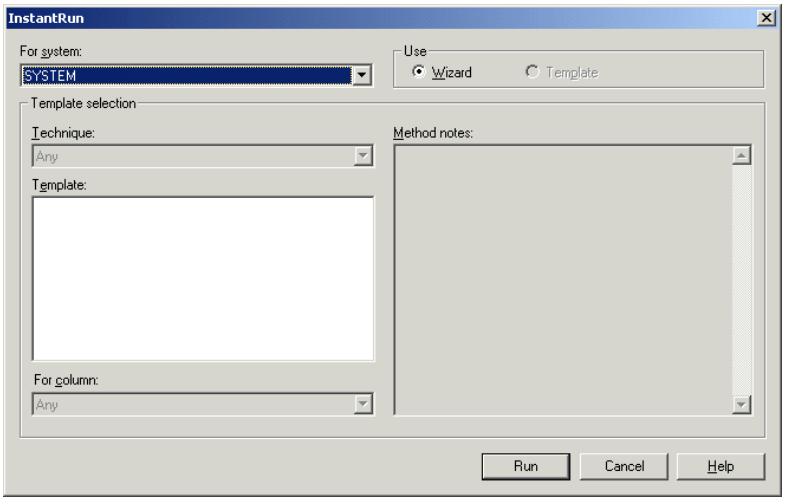
Buffer A11:	Distilled water
Buffer B1:	0.4% acetone in distilled water
Test flow rate:	5 ml/min in ÄKTAexplorer 10. 10 ml/min in ÄKTAexplorer 100.
Test run time:	Approximately 30 minutes

6.4 *Running the installation test method*

1 In **UNICORN Main menu,** select **File:Printer Setup....** Select the appropriate printer from the list and select **Landscape.** Then click **OK** to acknowledge the printer chosen.

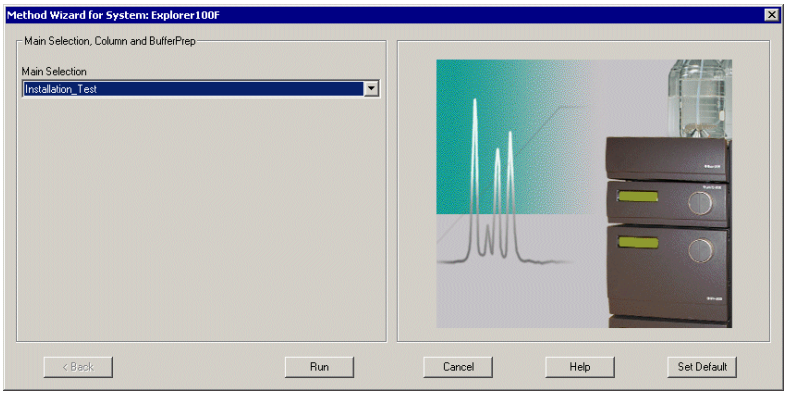


2 Click the **Instant Run** button . The **Instant Run** window opens.

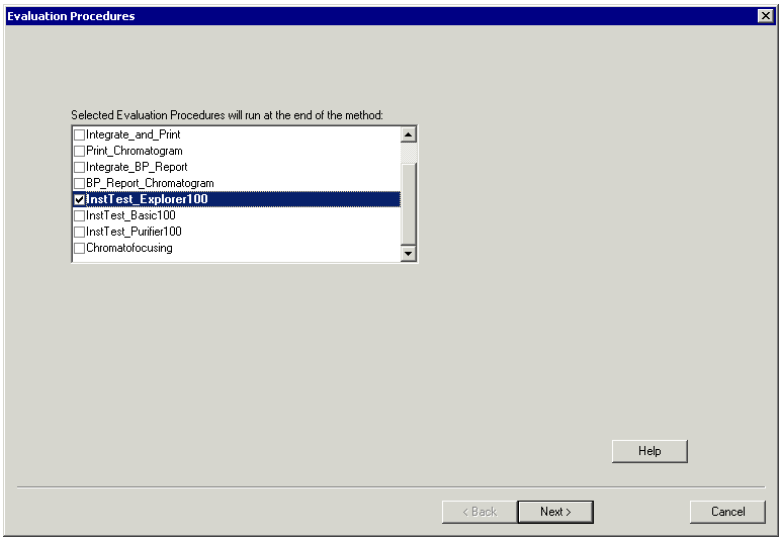


Select the appropriate system and click **Run.**

3 Select **Installation_Test** in the Method Wizard. Click **Run.**



4 In the **Evaluation Procedures** window, select the procedure for your system, for example, **InstTest_Explorer100.**



Note: *Explorer 10 systems have a specific evaluation procedure that includes the autosampler peaks. The name of the procedure has the extension* ***_A90X.***

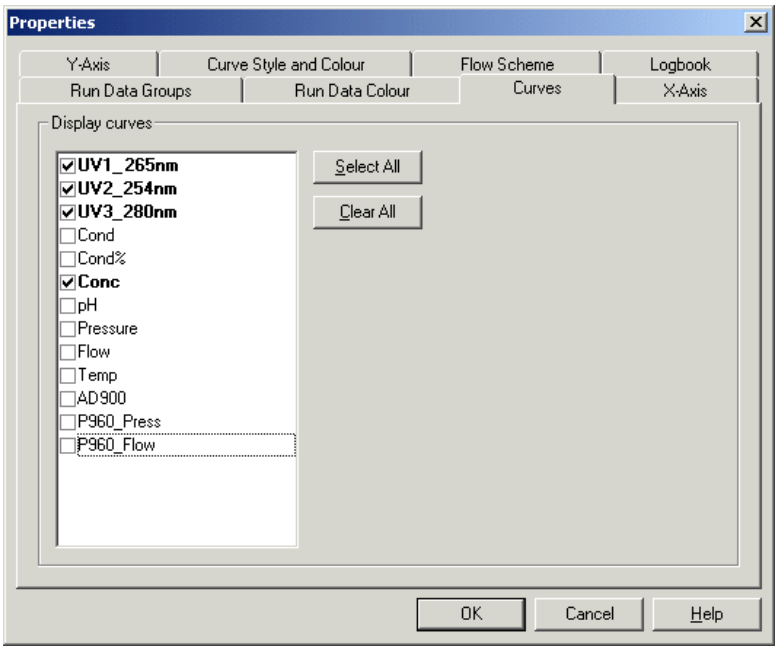
5 Click **Next** in the **Method Information** window.

6 Click **START** in the **Result Name** window to start the installation test.

The progress of the test is monitored in the **System Control** module. The installation test run time is approximately 30 min.

7 To customize the **Curves** pane, right-click in the pane and select **Properties.**

8 Click the **Curves** tab.

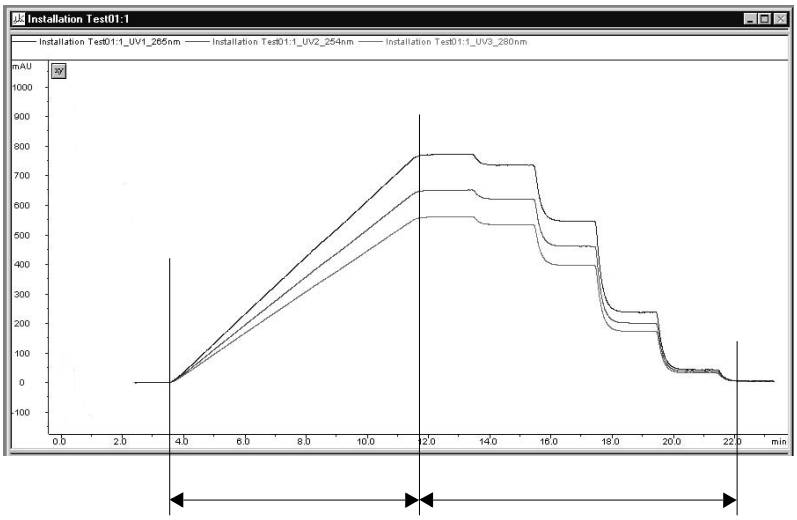


9 Select the following curves to be displayed:

- **UV1_265nm**
- **UV2_254nm**
- **UV3_280nm**
- **Conc.**

Clear all other highlighted curves. Click **OK**.

10 When the test is finished, the printer automatically prints the chromatogram and the test result.



6.5 *Evaluating the installation test results*

6.5.1 Automatic evaluation

The system automatically prints the test result when the test is finished. The print-out consists of a chromatogram and an evaluation of the test result.

- If the gradient test result is OK, the print-out says “Gradient linearity accepted”.
- If the step response test result is OK, the print-out says “Step response accepted”.
- If the UV response test result is OK, the print-out says “UV response accepted”.

If any of the evaluated values fall outside the specified range, go to step *6.6 Correcting faulty evaluation results*.

6.5.2 Manual evaluation

If your chromatography system deviate from the standard configuration, e.g. if optional components have been installed, the automatic evaluation will not give a reliable result. If so, perform a manual evaluation as described below.

1 Select the **UNICORN Main menu** module.

2 Click on in the **Results** window and then double-click on the **Wizard Generated001** icon to open the result file.

3 Right-click in the **Curves** pane and select **Properties.**

4 Click the **Curves** tab and select the following curves to be displayed:

- **Wizard Generated001:1_UV1_265nm@01,SMTH**
- **Wizard Generated001:1_UV2_254nm@02,SMTH**
- **Wizard Generated001:1_UV3_280nm@03,SMTH**
- **Wizard Generated001:1_Conc**

5 Click **OK**.

6 Right-click in chromatogram window, and select **Marker.**

7 Make sure that the UV1 curve value is displayed.

8 Read the absorbance for the steps corresponding to **Wizard Generated001:1_UV1_265nm@01,SMTH.** Move the vertical bar to the constant section of each plateau by dragging it. Enter theabsorbance values (in mAU) in column 2 in the Step response table of the Test record (see page 29), leaving out the decimals.

9 Read the absorbance for the plateaus corresponding to 0% and 100%B for the curves (click on the curve name to change the curve reading):

- **Wizard Generated001:1_UV1_265nm@01,SMTH**
- **Wizard Generated001:1_UV2_254nm@02,SMTH**
- **Wizard Generated001:1_UV3_280nm@03,SMTH**

  and enter the values in column 2 in the UV response table of the Test record (see page 31).

10 Click **Print** under **File** to print the chromatogram.

Evaluating the gradient
Place a ruler along the gradient part of curve **Wizard Generated001:1_UV1_265nm@01,SMTH** in the printed report.

The curve should be linear between 10% B and 90% B and void of discontinuities.

Evaluating the step response
Calculate the relative adsorption plateau heights for curve **Wizard Generated001:1_UV1_265nm@01,SMTH** as follows:

1 Subtract the base line value (0%B) from each of the values in column 2 in the Step response table of the Test record (see page 29) and enter the results in column 3.

2 Divide each value in column 3 by the base line corrected value corresponding to 100%B, multiply by 100 and enter the results in column 4.

The values of column 4 should all fall within the intervals given in column 5.

Evaluating the UV response
Calculate the UV response ratios in the following way:

1 Subtract the base line values (0% B) corresponding to each UV curve from the values in column 2 of the UV response table of the Test record (see page 29) and enter the results in column 3.

2 Calculate the absorbance ratios 265 nm/254 nm and 265 nm/280 nm using the values of column 3 and enter results in column 4.

The ratios obtained should all fall within the intervals given in column 5.

6.6 Correcting faulty evaluation results

Should any of the evaluated values fall outside the specified range, proceed as follows:

- If the system differs from the standard configuration, evaluate the result manually.

  If the faulty evaluation result remains, continue below.

6.6.1 Faulty gradient

- The gradient is linear but the interval is too small - Mixer chamber too large, or faulty mixer.
- Disturbances – may arise from air in the pump, pump valves or bad sealings in the pump. Refer to the *Pump P-900 User Manual*.

6.6.2 Faulty step response

- If all values are faulty – air in pump or faulty pump.
- 5% and 95% faulty – bad sealing in pumps (5% faulty = pump module B, 95% faulty = pump module A).

7 Test record

Date: .....

ÄKTAexplorer serial no.: .....

7.1 Gradient test result

Gradient linear from..... %B to ..... %B. (10 - 90%)

7.2 Step response test result

Step response table:

1 Programmed Conc.%B	2 Value read	3 Baseline corrected value	4 Normalised value	5 Allowed interval
100				
95				94 – 96
70				69 – 71
30				29 – 31
5				4 – 6
0				

7.3 UV response test result

UV response table:

1 Wavelength (nm)	2 Value read		3 Baseline corrected value	4 Absorbance ratio	5 Allowed interval
	100% B	0% B			
254					
265/254					1.11 – 1.26
265					
265/280					1.26 – 1.53
280					

8 Installation record

Check	Sign	Remarks
1 Unpacking		
• Contents according to packing lists.		
• All packing material removed.		
• No visible damage.		
2 Installation		
• Injection valve waste tubings (port 4 and 5, marked W1 and W2) to waste reservoir.		
• Outlet valve waste tubing (port 1, marked W3) extended to waste reservoir.		
• Column holder installed.		
• pH electrode holder installed (optional).		
• Computer and printer installed.		
• UniNet-1 cabling installed.		
• Mains power cabling installed.		
3 Installation test		
• Solutions prepared.		
• Tubings to piston seal rinsing system in 20% ethanol.		
• ÄKTAexplorer prepared.		
• Installation Test method run.		
• Installation Test results evaluated.		
• Test Record completed.		
• Registration Form completed.		
• Test Record and copy of Registration form stored in System Logbook.		
• Registration form posted to Service Administration.		
• Installation Guide stored in User Manual box for future use.		

9 Registration form

IMPORTANT!
WARRANTY REGISTRATION INFORMATION

Please ensure that this form is completed and returned to Service Administration to register the users' reuipment under warranty.

Name:.....

Institute/company:.....

Adress: .....

Department/location:.....

Post Code: .....

Phone Number: ..... Fax Number: .....

End Users: ..... E-mail: .....

Date of Installation: ..... Quote No: .....

Customer Oder No: ..... Invoice No: .....

Support Agreement purchased with the instrument: Y / N

If YES give details:.....

Installer (name): .....

Signature of Installer: .....

Installation Accepted:..... Date:.....

Note: *Fill in serial numbers over-leaf.*

9.1 Components

ÄKTAexplorer system serial numbers:.....

QTY	Part Number	Description	Serial Number
		System rack	
		Mixer M-925	
		Monitor UV-900	
		Pump P-900	
		pH/C-900	
		INV-907	
		PV-908	
		SV-903 (A)	
		SV-903 (B)	
		Computer	
		Computer display	

www.gehealthcare.com/akta

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